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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,147	01/28/2004	Masayuki Nakanishi	2004_0105A	9729

513 7590 11/16/2005

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EXAMINER

ELEY, TIMOTHY V

ART UNIT PAPER NUMBER

3724

DATE MAILED: 11/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/765,147

Applicant(s)

NAKANISHI ET AL.

Examiner

Timothy V. Eley

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) 24-51 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/28/04, 1/31/05.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

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DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- "a controller . . . region"(lines 3 and 4) is vague and indefinite. A portion of what?

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1,2,4,5,9, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakamura et al(6,933,234).

- Nakamura et al discloses a substrate processing apparatus for polishing a substrate, comprising; an edge-portion polisher for

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pressing a polishing tape against an edge portion of a substrate; and a bevel-portion polisher for pressing a polishing tape against a bevel portion of the substrate. See figures 1A and 1B.

- Regarding claim 2, as broadly recited, the edge-portion polisher and the bevel-portion polisher are provided in a polishing unit.
- Regarding claim 4, the polishing unit (as broadly recited) has a cleaning device for conducting a primary cleaning of a polished substrate. See column 19, lines 5-10.
- Regarding claim 5, the rounded ends (an portions extending therefrom) of cover member 4a functions as a pair of clamp members for clamping upper and lower surfaces of the edge portion of the substrate through the polishing tape. See figure 1B, and column 6, lines 36-49.
- Regarding claim 9, the bevel-portion polisher is structured to polish the bevel-portion of the substrate by pressing the polishing tape against the bevel-portion of the substrate with a polishing head having a resilient member while the substrate is held and rotated by a substrate holding table. See figures 16A-16F.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the

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art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 3, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al in view of Steere, Jr. et al (6,306,016).

- Nakamura et al is explained above. In addition, Nakamura et al discloses a notch polisher for polishing a notch of the substrate. See figure 2A, and column 3, 60-62.
- Nakamura et al does not disclose a notch polisher for pressing a polishing tape against a notch in the substrate and making a relative movement between the polishing tape and the substrate.
- Steere, Jr. et al discloses a notch polisher for pressing a polishing tape against a notch in a substrate and making a relative movement between the polishing tape and the substrate. See specifically figures 1-5.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Nakamura et al apparatus by replacing the notch polisher therein with a notch polisher for pressing a polishing tape against a notch in the substrate and making a relative movement between the polishing tape and the substrate, as taught by Steere, Jr. et al, in order to allow for more accurate polishing of the notch.
- Regarding claims 11 and 12, in Steere, Jr. et al, the polishing tape is pressed against the notch in the substrate by a resilient

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member(13), and the resilient member is vertically movable. See specifically figures 1-3, and column 2, lines 65 and 66.

7. Claims 5-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al in view of Sandvold(6,527,629).

- Nakamura et al is explained above.
- It may be considered that Nakamura et al does not specifically disclose an edge-portion polisher structured to polish the edge-portion of the substrate by clamping upper and lower surfaces of the edge portion of the substrate through the polishing tape by a pair of clamp members while the substrate is held and rotated by a substrate holding table.
- However, Sandvold discloses a pair of clamp members(1a,1b) as recited by applicant, for clamping upper and lower surfaces of the edge portion of a substrate through a polishing tape(6). See figures 1 and 3, and column 3, lines 5-22)
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Nakamura et al apparatus by replacing the cover members(4a, etc .) with a pair of clamp members for clamping upper and lower surfaces of the edge portion of a substrate through a polishing tape for more adequately polishing the edge portion of the substrate as taught by Sandvold.

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- Regarding claim 6, the clamp members are movable in a radial direction of the substrate as clearly shown in figure 3 of Sandvold.
- Regarding claim 7, as broadly recited by applicant, roller 1c functions as a roller guide for guiding the polishing tape radially outwardly of the substrate, and the use of the roller guide 1c allows guiding of the polishing tape from one of the clamp members toward the other of the clamp members, since without the roller guide, the polishing tape would not be efficiently guided from one clamp member to the other clamp member.
- Regarding claim 8, the edge-portion polisher as modified further comprises a mechanism(11) for opening and closing the clamp member, the mechanism being vertically movable as clearly depicted by "y" in figure 1.

8. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al in view of Hongo et al(6,921,466).

- Nakamura et al is explained above.
- Nakamura et al does not disclose an image sensor for imaging a region, being polished, of the substrate while the substrate is being polished, and a controller for processing an image obtained by the image sensor to determine a polishing state of the region being polished and for detecting a polishing end point from the polishing state of the region being polished.

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- Hongo et al disclose an image sensor for imaging a region, being polished, of a substrate while the substrate is being polished, and a controller for processing an image obtained by the image sensor to determine a polishing state of the region being polished and for detecting a polishing end point from the polishing state of the region being polished. See column 13, lines 54-62, and column 17, lines 21-38.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Nakamura et al apparatus by providing an image sensor for imaging a region, being polished, of the substrate while the substrate is being polished, and a controller for processing an image obtained by the image sensor to determine a polishing state of the region being polished and for detecting a polishing end point from the polishing state of the region being polished, as taught by Hongo et al. Also, incorporating these features into the Nakamura et al apparatus would have rendered it more precise.

9. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al in view of Hongo et al(6,921,466) as applied to claims 14 and 15 above, and further in view of Sekine et al(6,104,481).

- Nakamura et al, as modified, is explained above.

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- Nakamura et al, as modified, does not disclose that the image sensor is a photosensor for applying light to a region, being polished, of the substrate and detecting light reflected by the region being polished while the substrate is being polished; and the controller analyzes scattered light detected by the photosensor to determine a polishing state of the region being polished and an end point from the polishing state of the region being polished.
- However, Sekine et al discloses that it is well known in the art to use an image sensor which is a photosensor for applying light to a region of a substrate and detecting scattered light reflected by the region for determining a state of a surface of the substrate. See specifically the abstract.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have further modified the Nakamura et al apparatus by replacing the image sensor therein with a photosensor which detects scattered light as taught by Sekine et al in order to provide a more accurate determination of the condition of a region, being polished, of the substrate and analyzing the scattered light detected by the photosensor to determine a polishing state of the region being polished and an end point from the polishing state of the region being polished with the controller.

10. Claims 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al in view of Boggs et al(6,102,776).

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- Nakamura et al is explained above.
- Nakamura et al does not disclose a controller for detecting a torque value to rotate the substrate on a basis of a signal from a motor for rotating the substrate while the substrate is being polished, and analyzing a change in the torque value, and wherein the controller detects a polishing end point from the change in the torque value.
- However, Boggs et al discloses a controller for detecting a torque value to rotate a substrate on a basis of a signal from a motor for rotating the substrate while the substrate is being polished, and analyzing a change in the torque value, and wherein the controller detects a polishing end point from the change in the torque value. See column 1, lines 14-23.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Nakamura et al apparatus by providing a controller for detecting a torque value to rotate the substrate on a basis of a signal from the motor for rotating the substrate while the substrate is being polished, and analyzing a change in the torque value, and wherein the controller detects a polishing end point from the change in the torque value as taught by Boggs et al.

11. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al in view of Chao et al(6,126,512).

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- Nakamura et al is explained above.
- Nakamura et al does not disclose a controller for measuring a tension applied to the polishing tape which is held in sliding contact with the region, being polished, of the substrate while the substrate is being polished, to determine a polishing state of the region being polished.
- However, Chao et al discloses a controller for measuring a tension applied to a polishing tape which is held in sliding contact with a region, being polished, of a substrate while the substrate is being polished. See abstract, column 1, lines 5-10, column 3, lines 16-24, column 4, lines 11-21, column 9, lines 7-29 and lines 51-end, and column 10, lines 1 and 2).
- Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Nakamura et al apparatus by providing a controller for measuring a tension applied to the polishing tape which is held in sliding contact with the region, being polished, of the substrate while the substrate is being polished, to determine a polishing state of the region being polished.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

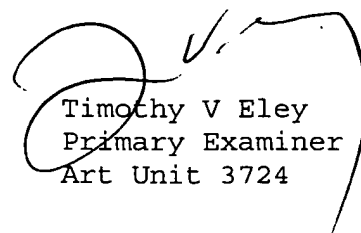
- The cited prior art discloses wafer processing apparatuses.

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy V. Eley whose telephone number is 571-272-4506. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Allan N. Shoap can be reached on 571-272-4514. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Timothy V Eley
Primary Examiner
Art Unit 3724

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